



EWNZ

APPENDICES

**TO THE RESPONSE TO THE COMMERCE COMMISSION ON
TELECOMMUNICATIONS ACT 2001:
SCHEDULE 3 INVESTIGATIONS INTO AMENDMENTS INTO
THE ROAMING AND CO-LOCATION SERVICES**

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Introduction

1. These appendices are submitted as part of Econet Wireless New Zealand Limited's Response to the Commerce Commission on Telecommunications Act 2001: Schedule 3 Investigations into Amendments into the Roaming and Co-location Services.
2. These appendices include information for which EWNZ seeks protection under the Telecommunications Commissioner's Confidentiality Order. Restricted Information has been marked in bold and enclosed between square brackets and designated as EWNZ Wireless New Zealand Limited Restricted Information as "**EWNZRI**". Highly sensitive and/or confidential information for which EWNZ has requested additional protection is enclosed in square brackets and designated as information requiring Additional Protection as "**EWNZAP**".

APPENDIX 1

Roaming Pricing Principles

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1. Overview of this Appendix

- 1.1 When referring to the retail-minus model we are dealing with the approach currently used in Schedule 1 of the Act, which is a manifestation of the Baumol-Willig Rule.¹ Where we address variations on that model we make this clear. This Appendix takes into account that Vodafone and Telecom each have substantial market power (SMP).
- 1.2 This Appendix commences with international best practice of flexible pricing methods, followed by the ladder of investment, which is dependent on that approach.
- 1.3 Before turning to issues in principle with retail-minus, we address retail-minus implementation problems with each of the “retail” and “minus” components.
- 1.4 We deal with price squeeze effects of retail-minus, and also the effects of the inability to control the retail price. We address experience in Ireland, the UK, Italy, and the EU.
- 1.5 We have separate sections dealing with aspects of the *Albion* decisions of October and December 2006, the first major appellate decisions on retail-minus since *Telecom v Clear* (the Privy Council in 1994).
- 1.6 Finally we propose an alternative approach to cost-based pricing, based on the views expressed by the Commission.

2 Executive Summary

- 2.1 The retail-minus model attracts considerable controversy. There has also been limited uptake internationally as recognised in Determination 497 (the TelstraClear wholesale determination), by the United Kingdom Competition Appeal Tribunal (“CAT”) as noted below, and by the Commission itself.² This is a sign that the model is seen by many regulators, academics, legislators, tribunals, and others as problematic.
- 2.2 Where it has been adopted, there is a trend toward:
 - 2.2.1 removing it; or
 - 2.2.2 replacing it with a retail-minus regime which minimises its problems (for example by designing the model so that the purpose is to avoid price squeeze, contrary to the basic retail-minus model which often causes rather than avoids price squeeze).
- 2.3 In addition to these regulatory changes, the CAT (in its October and December 2006 Judgments in *Albion*) has strongly criticised the model, noting that it may not even achieve the one limited objective held out for the retail-minus model: productive efficiency.³
- 2.4 The “*ladder of investment*” is an important policy driver in the mobile services market. The current prescriptive approach to pricing does not fit the needs of the ladder of investment. In particular, retail-minus pricing (especially in its basic form) cannot work with the ladder model. For example, the pricing is out of the regulator’s control as the incumbent, not the regulator, sets the retail price. In any event, retail-minus is inconsistent with a costs-based approach to co-location or roaming.
- 2.5 In addition to these objections in principle, the CAT decision is an illustration of the difficulties in implementing the model. The Commission itself has identified, and encountered, implementation problems, which can be more complex to

¹ See the overview in the Commission’s Select Committee submissions at para. 42.

² In the Commission’s Select Committee submissions.

³ *Albion* October Judgment and *Albion* December Judgment.

resolve than the application of initial and final pricing principles on a cost basis.⁴

- 2.6 The retail-minus model in Schedule 1 of the Act is prescriptive in nature. Thus it cannot be varied to meet existing and changing needs.
- 2.7 Having a prescribed model of any sort (such as retail-minus) is contrary to best practice (as illustrated by the approach in the EU). Best practice would enable the regulator to modify pricing based upon appropriate outcomes at the time.
- 2.8 The CAT's October and December 2006 decisions in *Albion* has confirmed the reservations of many (including Professors Baumol and Willig, and Dr Kahn, as well as the Privy Council in *Telecom v. Clear*) that retail-minus is not a stand alone solution in a Significant Market Power (*SMP*) context. It is necessary also to regulate the retail price. However that does not happen in New Zealand. The retail-minus model should not be used, where there is *SMP*, unless the retail price is regulated (this is an unlikely scenario and there are other solutions that avoid the problems of retail-minus). As the Commission notes:
- “..through the retail price mechanism the incumbent can stifle the development of infrastructure based competition at the deepest level since de facto it controls the margin between the two products.”⁵*
- 2.9 That is a strong point and shows how large is the problem with retail-minus pricing.
- 2.10 However, even if the retail price is regulated, retail-minus is likely to fail with respect to achieving appropriate dynamic efficiencies.
- 2.11 *Albion* confirms that the retail-minus model may not even achieve its main objective: productive efficiency. It does not achieve allocative or dynamic efficiency. Its effects are often anti-competitive. For example, often only a “*super-efficient*” competitor can succeed: a merely “*efficient*” competitor cannot.
- 2.12 *Albion* is a negative report on retail-minus, and it is also an illustration of the model's implementation problems.
- 2.13 Flexible cost-based pricing best meets the Telecommunications Act's section 18 objectives without the problems of retail-minus. For example, dynamic efficiencies and incentives to invest (including those of the incumbents) can be met with a cost-based model. If it is considered that a pure TSLRIC model in itself would not meet those objectives, the pricing model could incorporate flexibility to achieve those objectives.
- 2.14 The Commission has itself designed a proposed approach in relation to UBS.⁶ Econet considers that the opportunity should be taken to design a more flexible model in line with best practice, so that the Commission can adopt the most appropriate pricing model (and amend it as necessary) during and subsequent to determinations. It is better to allow some flexibility of approach (in line with international best practice) rather than constructing a prescriptive model for inclusion in Schedule 1 of the Act.
- 2.15 If the Commission does not want to go that far, the costs-based model should give flexibility to the Commission during or subsequent to the determination. In this way, for example, the Commission can assess the best approach to deal with issues such as pricing. This can used by the Commission, for example, to have a mechanism to encourage the access seeker of roaming services to move away from roaming toward its own infrastructure (while still achieving the correct outcomes in areas where economies of scale and density indicate facilities-based competition is not efficient).

⁴ In relation to the Commission there are the ongoing difficulties with the retail-minus model and UBS, and the issues identified by the Commission in the Commission's Select Committee submissions.

⁵ Commission's Select Committee submissions at para. 48

⁶ See Commission's Select Committee submissions at para. 54 (table 2).

- 2.16 This Appendix does not make reference to all of the points in the Commission's observations throughout the Commission's Select Committee submissions. However the Commission is referred to those submissions for further detail, and support for Econet's submission that retail-minus pricing should not be adopted. The issues applicable to bitstream (which are the focus of Appendix 1 of those submissions) largely apply to roaming and mobile services (often, there is even more reason to apply them for roaming). Additionally the experience with bitstream and LLU is illuminative for roaming and mobile services, partly in view of the lack of relevant material. For this reason we refer extensively to those submissions as well as the *Albion* judgments
- 2.17 In relation to retail minus, in a passage applicable also to roaming, the Commission noted:⁷

The use of the retail minus pricing principle for bitstream pricing raises important implementation and conceptual problems whose potential consequences should not be underestimated. As a result of these difficulties, the calculation of the various elements of the retail minus regime (i.e. imputed retail price and discount) are likely to become more imprecise and to be more time-consuming. In turn, this may increase the risk of regulatory errors, and hence: legal challenge. Equally important is the potentially adverse impact on the investment incentives of Telecom and its competitors if the resulting prices for the bitstream services are out-of-line with corresponding costs.

3 Price regulation: best practice

- 3.1 Overseas, there is a move away from the prescriptive pricing approach, typical of Schedule 1 of the Act, to one which has flexibility and enables change to meet the needs of a particular situation. The Commission has used the EU legal framework as an example of the contemporary preferred approach to the regulation of pricing. In the EU, there has been a change from prescriptive methods to more flexibility, with the regulator having discretion over choice of the pricing methodology, standard, and form of control that it considers fits best. The pricing principle applicable to a particular product can be altered over time by the regulator.⁸ One reason underlying the use of this approach is better implementation of the "ladder of investment", to which we refer in the following paragraph.
- 3.2 This flexibility has enabled national regulatory authorities (NRA) to evolve more effective and efficient pricing methods. For example, the Irish regulator has changed from the basic retail-minus model of some years back, to one which involves a detailed and complex framework which has the aim of preventing price squeeze⁹. Other jurisdictions (such as Italy) have recognized that retail-minus does not work moved to cost-based pricing.¹⁰
- 3.3 That this is the appropriate approach is demonstrated by its international uptake. We are not aware of any other jurisdiction which incorporates in its legislation such a restrictive and prescriptive retail-minus model for roaming as that used in the Telecommunications Act.

4 The Ladder of Investment

- 4.1 We summarise here some of the key points in the Commission's overview of the "Ladder of Investment":
- 4.1.1 Competition takes many forms along a continuum (largely overlapping the ladder of investment) between services-based competition (SBC) and facilities-based competition (FBC)).

⁷ See Commission's Select Committee submissions at para. 45.

⁸ See Commission's Select Committee submissions at para. 27.

⁹ See Commission's Select Committee submissions at para. 34.

¹⁰ See Commission's Select Committee submissions at para. 32-33.

4.1.2 FBC is generally superior to SBC (for the reasons the Commission identifies at para 12 of its submissions).

4.1.3 The two forms of competition (FBC and SBC) are not necessarily opposed or substitutable. Rather, SBC is necessary for and complementary to FBC. (Applying this here, roaming (at the SBC end) is not necessary opposed to, or substitutable for, full network roll-out (at the FBC end). Illustrating this, in a way which applies also to roaming, co-location, and roll-out of the new entrants' network:¹¹

For instance, economics (e.g. economies of scale and of density) may dictate that in some geographic areas only very limited FBC can be expected while in others, competition between different technologies can be achievable....

... The nature of access regulation may affect the balance between FBC and SBC and hence the investment incentives of the incumbent and entrants as well as competition. For example, an access price set too high relative to costs can deter efficient downstream competitors without encouraging efficient investment. On the other hand, an access price set too low can distort entry signals, mute the investment incentives of the regulated firm and risk crowding out investment in competing facilities.

4.1.4 Thus the ladder of investment has been developed:¹²

The level and terms at which access may be granted can affect the balance between FBC and SBC. A ladder of investment strategy is depicted as a regulatory approach to access regulation consistent with the investment incentives of both the incumbent and its competitors. It is essentially a mechanism designed to encourage FBC at the deepest level for assets which are replicable. ...

... Under a ladder approach, competitors are encouraged progressively to make investment in assets which are less and less replicable (i.e. more risky or difficult). Entrants are incentivised to do so through access regulation. The regulator allows entrants to compete with the incumbent at different points on the spectrum between SBC and FBC. During the initial phase, entrants can build their customer base and undertake minor, easily replicable, investments. As their revenues grow and they accumulate assets, they are assumed to climb the ladder and undertake more risky and substantial investments involving sunk costs...

4.1.5 Implementing a ladder approach requires the regulator to regulate access in dynamic fashion, to incentivise competitors to replicate assets except where economies of scale, density, or enduring economic bottlenecks are such that this is not viable. To do this, the regulator must have:

- (a) Flexibility to adjust the main regulatory levers, including price, over time (*"Flexibility and adaptability of regulatory intervention are paramount for promoting infrastructure-based competition via the ladder of investment."*¹³)

¹¹ Commission's Select Committee submissions at paras 13 and 14

¹² Commission's Select Committee submissions at para. 15 and 16

¹³ Commission's Select Committee submissions at para. 22

(b) Pricing principles that are consistent with one another.¹⁴

4.1.6 The ability to use the ladder concept allows the regulator to encourage an entrant's progress along the ladder, while encouraging investment (and the incumbent faces additional competitive pressures that in turn may spur further investment).¹⁵

4.1.7 The classic illustration of the need to allow continued services-based competition in view of enduring economic bottlenecks are the BT Undertakings.

4.1.8 As to the need to allow for continued access to services due to geographic differences, (a key example being roaming and, to a lesser extent, co-location):¹⁶

Regulatory intervention will have to be calibrated to account for likely geographic differences in the extent to which assets can be replicated. For instance, conditions of replicability may be radically different between a concentrated and highly populated urban area where economies of scale/density may be quickly exhausted and a rural/provincial area with more scattered population.

4.1.9 The ladder of investment is an important policy driver in the mobile services market. The current prescriptive approach to pricing does not fit the needs of the ladder of investment. In particular, retail-minus pricing (especially in its basic form) cannot work with the ladder model (for example, the pricing is largely out of the regulator's control as the incumbent not the regulator sets the retail price). In any event, retail-minus is inconsistent with a costs-based approach to co-location and roaming.

5 Retail-minus: problems with implementation of the "retail" component

5.1 Experience has shown that there are real difficulties with implementation of the retail-minus model. Most of the Commission's observations on retail-minus pricing problems in its Select Committee submissions apply also to the prospect of retail-minus pricing relating to roaming.

5.2 At paragraphs 44-45 of its submissions, the Commission identified major implementation difficulties. These are illustrated by the problems in setting the "retail" component of the retail-minus model, in relation to UBS, in determinations 568 and 582, the appeal to the High Court, and the reconsideration of decision 582. The Commission has been faced with real difficulties in imputing the retail price, in relation to UBS. It will face similar if not more difficult problems with roaming and these will increase over time. For example:

5.2.1 The decision around which products to include in the basket of retail products, from which the retail price of the UBS input was to be imputed, was difficult and remained open to gaming. As the Commission observed,¹⁷ this decision will become even more difficult as the range of products increases, and new features are included. The UBS decisions included consideration of only a relatively limited number of products and non-price variables (in particular there is the issue of the treatment of international and domestic data, the handling of ISP charges, and bundling of the retail products).

¹⁴ Commission's Select Committee submissions at para. 18

¹⁵ Commission's Select Committee submissions at para. 19. Paragraph 20 illustrates the options available to the regulator where it has sufficient flexibility.

¹⁶ Commission's Select Committee submissions at para. 23

¹⁷ See Commission's Select Committee submissions at para 44.

- 5.2.2 As the Commission identifies:¹⁸
- This difficulty was illustrated during the UBS Determinations and was one of the main reasons put forward by the Italian regulator to abandon the retail-minus pricing approach.*
- 5.2.3 In addition, the Commission refers to greater problems in the future, as there is additional complexity with enhanced features of the UBS service, based on a platform that can be used to provide the wide range of services, such as VoIP, IPTV, etc.
- 5.2.4 The mobile retail market is marked by an even greater array of retail products with considerable pricing complexity along with non-price components which add to that complexity. Additionally, there is a clear trend for mobile operators to provide bundled offerings. A vertically integrated provider such as Telecom can currently provide these. A “pure” mobile operator such as Vodafone can increasingly provide bundled solutions including because of its acquisition of ihug. The drive for triple-play is rapidly extending to quad-play (hence, greater complexity and difficulty in imputing the retail price for roaming).
- 5.2.5 This will increase as the services provided by mobile become more diversified. The Commission will face an exceptionally difficult task in determining the base retail prices and products from which to impute the price for roaming.
- 5.2.6 This problem will further increase as 3G has expanded offerings. However, by way of example, this level of complexity will increasingly occur with GSM services anyway (such as bundled offerings (including quad-play) via Vodafone’s acquisition of ihug)). Thus, it is an issue, whether or not 3G roaming is included in the service description.
- 5.2.7 There is a difference between roaming and UBS services, which makes calculation of the “*retail*” component even more difficult. There is a ubiquitous input into Telecom’s ADSL services which is equivalent to the UBS component. That is not so, however, in relation to roaming. Roaming is only used on the limited occasions when the access seeker’s customer is outside its own network. Even when the relevant basket of retail products (and relevant non-price components) are established, there are difficulties in extracting components from the retail price to impute the retail price equivalent of the roaming service. Any approach is also open to gaming by the access provider.¹⁹
- 5.2.8 The U.K.’s Competition Appeal Tribunal, in its October and December 2006 *Albion* judgments, produced the most thorough examination of retail-minus pricing since the Privy Council’s 1994 decision in *Telecom v. Clear*. In this Appendix²⁰ we focus on the issues of principle raised by the Tribunal in an appeal of the regulator’s decision in a retail-minus model. The Tribunal was extensively critical of the regulator’s implementation of retail-minus both in respect of the retail component and the minus component. In its analysis, many of the difficulties in providing an appropriate retail-minus price were identified. There are difficult issues to be resolved which highlight the complexities of this model. This ultimately makes it more complex and difficult to implement than a cost-based model. This relative difficulty

¹⁸ See Commission’s Select Committee submissions at para 44.

¹⁹ See Commission’s Select Committee submissions at para. 44.

²⁰ And in the Wigley Retail-Minus Pricing article, Wigley Price Squeeze article and Wigley UBS Pricing article.

as between cost-based and retail-based models was also identified by the Commission.²¹

- 5.2.9 Other material shows that the retail-minus model raises an array of difficult issues, such as the IRG's 2006 *Principles of Implementation and Best Practice regarding the implementation and use of Retail-Minus pricing as applied to electronic communication activities*.²² The basic retail-minus model, as applied in New Zealand, is not capable of handling many of the "entry-level" implementation issues with retail-minus, let alone its more complex aspects.

6 Retail-minus: calculation of the "minus" component

- 6.1 Thus far all regulated services have adopted the 16% discount determined by the Commission in determination 497. Although TelstraClear and Telecom agreed that this discount should increase, commercially, to 18%, Telecom continues to require that the 16% discount be adopted (as happened in respect of determination 582). In view of the cost of seeking, and the difficulties of assessing, a different retail-minus discount, the position has defaulted to the 16%. This 16% is referable to a bundle of legacy products. However, the Commission identifies in its submissions²³ the likely difference between those legacy products which are mature, and the newer range of broadband access products. For example, the Commission identifies the likely significantly higher customer acquisition costs associated with the broadband market (thus the discount based on legacy products is inappropriate).
- 6.2 This applies even more to the mobile market. For example, while customer acquisitions costs are identified as a significant cost component for broadband compared to other telecommunications services, this is even more the case in respect of mobile services. Subscriber acquisition costs are a major cost component of any mobile service. The 16% is completely inappropriate for mobile.
- 6.3 Benchmarking the "minus" component is even more problematic for roaming than it is for bitstream, and so the Commission observed:²⁴
- This implies that a discount benchmarked against a wide range of retail services may underestimate the actual retail cost and hence lead to insufficient margins for ISPs to compete on a stand alone basis with the incumbent. Further, as other countries are moving away from retail-minus for broadband services, the pool of countries to benchmark may become limited.*
- 6.4 That final observation (the lack of benchmarks internationally for the discount) is even more acute for retail-minus in respect of mobile. Not only are there no regulated prices for roaming that can be ascertained by any party but of course there are none which are based on retail-minus. Therefore there are no benchmarks to calculate the discount.
- 6.5 Additionally, the *Albion* October Judgment (and the IRG paper referred to in the previous paragraph) illustrates the difficulties surrounding calculation of the minus component. This is a contentious and complex calculation.

7 Retail-minus and price squeeze

- 7.1 We will expand on this issue when dealing with the *Albion* decision. At this point we note that the Commission has already observed this problem:

"The existing retail minus mechanism in its current format does not prevent potential price squeezes by the incumbent. As explained above, in countries where retail minus is in place, it is generally

²¹ See Commission's Select Committee submissions.

²² <http://irgis.anacom.pt/admin/attachs/417.pdf>

²³ See Commission's Select Committee submissions at the third bullet point in para. 44.

²⁴ See Commission's Select Committee submissions at para. 44.

complemented by additional safeguards, including imputation requirements, to ensure compliance with the control on an ex ante basis and to prevent gaming by the incumbent.”²⁵

- 7.2 Given the various problems with retail-minus, and that a cost-based model can achieve appropriate outcomes, Econet submits that the retail-minus model should be eliminated, rather than trying to patch it together with “workarounds”.

8 Retail-minus and inability to control the retail price

- 8.1 This perhaps is one of the most severe deficiencies in the model. We will expand on this when dealing with the *Albion* decision. However we note at this point:

- 8.2 For the ladder of investment to work, the regulator must be able to control pricing and relativity between prices. However, the retail-minus model has the key component in the pricing (the retail price) within the control of the incumbent not the regulator.²⁶ The Commission noted:

“To provide appropriate investment incentives to entrants while preserving the investment incentives of the incumbent, the regulator must have a degree of control over the absolute levels and the margin between the two access products. Further, flexibility is required to dynamically adjust regulation to market developments and to incentivise the incumbent’s competitors.”²⁷

And in an observation by the Commission, equally applicable to any service:

“The very nature of the retail minus pricing principle means that the Commission cannot influence the relative prices and margins between access products, since by definition the bitstream price will depend on Telecom’s retail pricing behaviour”²⁸

- 8.3 As the *Albion* decision notes, it appears to be widely accepted (including by Professors Baumol, Willig, and Dr Kahn, by the Privy Council, and by the experts in the *Albion* case), that the retail-minus model is only a partial solution. In an SMP scenario (as here), the retail price must be regulated.²⁹ In New Zealand the retail price is not regulated (even though it can be made the subject of regulation) and thus the model fails. Ironic though it is that New Zealand (where the rule achieved its first appellate manifestation) persists in this flawed approach, the Commission now has an opportunity to solve this fatal problem for future products.

- 8.4 A further issue with the retail-minus model, in view of the fact that the price is effectively controlled by the incumbent, is that the necessary degree of certainty is lost. The margins between roaming pricing, co-location pricing and the cost of a build are important matters when the new entrant makes its investment decisions. However, as the Commission notes: *“..through the retail price mechanism the incumbent can stifle the development of infrastructure based competition at the deepest level since de facto it controls the margin between the two products.”³⁰*

9 Retail-minus in Ireland

²⁵ Commission’s Select Committee submissions at para. 44

²⁶ Theoretically, the ability for an SMP incumbent to set the price is constrained by competition law such as §36 Commerce Act, price squeeze principles, etc. However, this is a largely ineffectual (in practice) *ex post* remedy, and leaves wide discretion (both at law and in practice) for the incumbent to set price unconstrained by the regulator.

²⁷ Commission’s Select Committee submissions at para. 47

²⁸ Commission’s Select Committee submissions at para. 49

²⁹ Or a solution developed which sets a notional retail price as noted in the Commission’s Select Committee submissions

³⁰ Commission’s Select Committee submissions at para. 48

- 9.1 The only specific pricing model to which the Commission refers in its October Report is the Irish decision on roaming. The regulator indicated that if it was required to set pricing, it would use a retail-minus model similar to the basic retail-minus model in New Zealand.
- 9.2 That was some years back, and it has not been necessary to implement the model. Since then however, there has been:
- 9.2.1 the movement mentioned above in relation to pricing models generally in the EU (including of course Ireland); and
- 9.2.2 the Irish regulator itself has moved away from this basic model (at least in relation to bitstream), to one which is designed to stop price squeeze (as opposed to the basic model which can facilitate price squeeze in many situations).³¹ This is a more complex model and is briefly summarised by the Commission in its Select Committee submissions³². The model includes a price squeeze imputation test on an *ex ante* basis. It includes a detailed and complex framework.
- 9.2.3 For reasons developed below, we consider that even a retail-minus model which is designed to minimise its deficiencies should not be adopted in New Zealand. This is partly because it is accepted that it is only a partial solution. The full solution requires, in an SMP context, control of the retail price as well. Additionally, the difficulties surrounding implementation of the retail-minus model remain in circumstances where the regulatory objectives can be achieved by using a cost-based model.

10 Retail-Minus in the United Kingdom

- 10.1 The Competition Appeal Tribunal's criticism of retail-minus in late 2006 is part of the strong trend away from that model in the UK.
- 10.2 A further illustration is that bitstream was initially priced on a retail-minus model. However, in view of margin squeeze concerns, leading to slow up-take of the bitstream product, Ofcom changed the position and introduced a "no margin squeeze rule" in 2004. Then in 2005, as part of the BT Undertakings regime, Ofcom policy changed to incentivise operators to move up the ladder of investment. Thus there is a trend away from the basic retail-minus model, and this is an illustration also of a flexible regulatory approach, which can effectively meet evolving circumstances.³³

11 Retail-Minus in Italy

- 11.1 Italy uses cost-based pricing to regulate roaming.³⁴ However, Italy's experience with retail-minus and bitstream illustrates the problems with that model.
- 11.2 In 2006, in view of difficulties with retail-minus, the Italian regulator (AGCOM) moved away from retail-minus to a cost-oriented model, in respect of bitstream.

³¹ ComReg, Consultation on retail-minus wholesale price control for the WBA market, 19 August 2005.

³² See Commission's Select Committee submissions at para. 34.

³³ This summarises the Commission's own overview in the Commission's Select Committee submissions at para. 28-31

³⁴ As does Norway, and Hungary sets national roaming charges at a maximum of 80% of the retail call origination fee (off-net). Cyprus and Switzerland are said to be retail-minus, but whether or not this is a complex model (as in Ireland for broadband) is not clear. ERG Report, *Mobile access and competition effects*, April 2006, pages 4 and 5
http://erg.eu.int/doc/publications/erg_06_45_report_on_mobile_access_market_competition.pdf

This happened even though the original model was designed to take out some of the basic retail-minus model's deficiencies.³⁵

11.3 As the Commission has summarised:³⁶

The assessment of replicability of the incumbent offers and the calculation of the 'minuses' or margins to deduct from the incumbent retail offers were a difficult and resource-intensive process.....

...In light of those difficulties, AGCOM decided to move to cost-orientation as the pricing principle applicable for bitstream at the beginning of 2006. More specifically, AGCOM justified this change by arguing that cost orientation: (a) was relatively simpler to implement compared to retail minus especially given the increasing complexity of retail offers (e.g. bundle of products, triple play offers) that render the computation of 'minuses' complex and imprecise; and (b) sends the right make or buy signal for investment in infrastructure at the local loop level (i.e. is consistent with a ladder of investment-type of argument) contrary to a retail minus approach that may lead to a distortion of investment incentives.

11.4 These conclusions (including that cost-based pricing is relatively simpler than retail-minus, the computation of the "minus" component is complex and imprecise, and that a costs-oriented model sends the right build versus buy signal for investment) are even more applicable to the pricing of roaming.

12 EU conclusions generally

12.1 The principles applicable to bitstream are largely applicable in relation to the pricing of roaming as well. Thus, the bitstream experience is illuminative, and provides substantially more information to inform the investigation, than is available from regulatory decisions on roaming.

12.2 As the Commission has observed, the main insights that can be drawn from its review of the European experience, in relation to pricing of bitstream, include:³⁷

- *the European regulatory regime gives regulators more flexibility than is currently, or proposed to be available in New Zealand over the choice of applicable pricing principles;*
- *regulators have used this flexibility and have altered pricing principles over time to adapt regulation to changes in competitive conditions;*
- *in countries where a retail minus pricing principle has been in place for bitstream, it has been accompanied by relatively strict compliance provisions and assessment by regulators, including ex ante imputation requirements to ensure that downstream competition is not stifled;*
- *cost-oriented bitstream prices are becoming more and more widespread in European countries as some of the countries (e.g. Italy and the UK) that initially adopted retail minus are moving towards cost-based prices or to an explicit control of margins between LLU and bitstream to address implementation difficulties and investment incentives issues..."*

³⁵ Commission's Select Committee submissions at para. 32

³⁶ Commission's Select Committee submissions at para. 32-33.

³⁷ Commission's Select Committee submissions at para. 32-33.

- 12.3 Again, these conclusions point to flexibility and a costs-based approach in respect of roaming.

13 **The *Albion* Competition Appeal Tribunal decisions: an overview**

- 13.1 The two decisions in October and December 2006 are the first major appellate decisions on retail-minus, since the Baumol-Willig Rule was approved by the Privy Council in *Telecom v Clear* in 1994. They constitute strong criticism not only of the way in which the regulator and incumbent implemented the rule in that case, but also in respect of the substantive validity of the rule. In this Appendix we overview the key issues. For more detailed summaries on the around 350 pages of judgment, see the three articles from Wigley & Company, referred to in the bibliography.
- 13.2 In this Appendix we will outline the Tribunal's understanding of advantages and disadvantages of the basic retail-minus model (which it equated to the Efficient Component Pricing Rule³⁸). The Appendix then deals with the Tribunal's conclusions on those perceived advantages and disadvantages. The decisions (in October and December) go into some detail in relation to implementation concerns (as noted above, these highlight further difficulties with the model).
- 13.3 Summarising, this appellate decision shows that any decision to implement retail-minus in its basic form needs to be considered very cautiously, in light of its adverse features.
- 13.4 In a market where the incumbent has significant market power (SMP), the Tribunal concluded that retail-minus should be supplemented by control of the retail price.
- 13.5 However, even then, retail-minus, with a controlled retail price, will often fail particularly as:
- 13.5.1 The model fails to achieve its key driver (productive efficiency) and it is harmful in relation to dynamic efficiencies.
- 13.5.2 Often, only a "*super efficient*" competitor (a rare beast) could succeed (a merely "*efficient*" competitor could not). Thus, retail-minus/ECPR often has the effect of shutting out real competition (as the Tribunal said, it throws the baby out with the bathwater).
- 13.5.3 The model may cause margin squeeze (it does not avoid it).
- 13.6 As well as criticism at the level of principle, the Tribunal panned the regulator's application of the principle in practice.
- 13.7 The CAT was considering retail-minus in the context of EU and UK competition legislation, including Part II of the Competition Act 1998. This takes the typical sort of pro-competition approach seen internationally, including encouragement of competition (this is similar to the s18 approach in the Telecommunications Act 2001 (NZ)).

14 ***Albion*: Advantages and disadvantages of retail-minus**

- 14.1 The Tribunal considered that the perceived advantages of retail-minus were that "*entry would occur only when entrants have lower total costs than the incumbent's avoidable costs. It thus ensures that the incumbent's costs continue to be fully funded, and that stranded assets are avoided.*"³⁹

³⁸ *Albion* October judgment; para. 650.

³⁹ *Albion* October judgment para. 650.

14.2 The Tribunal noted five features which raised questions as to whether ECPR is compatible with the introduction of effective competition⁴⁰:

14.2.1 the risk of entrenching monopoly rents or inefficiencies in the retail price;

14.2.2 the possible lack of the dynamic effect of competition, resulting from the fact that the dominant incumbent is indifferent as to who supplies the customer;

14.2.3 the raising of barriers to entry;

14.2.4 the risk of a price squeeze; and

14.2.5 difficulties in properly identifying the “minus” element in the retail-minus calculation.

15 ***Albion*: Productive, allocative and dynamic efficiencies**

15.1 To help it work through the advantages and disadvantages, the Tribunal analysed the suitability of the model within this standard economics framework⁴¹, to reflect pro-competition drivers.

15.2 In *Albion*, the CAT said that there was a key difference between the approach of the incumbent’s expert (Professor Armstrong) and the competitor’s expert (Dr Marshall). The incumbent focused on static equilibrium analysis (which deals with **allocative** and **productive** efficiency). That deals with a given state of affairs in a market rather than the competitor’s focus: **dynamic** efficiency (the process by which a market moves from one state of affairs to another)⁴².

15.3 While the incumbent acknowledged that ECPR/retail-minus would only achieve **productive** efficiency, the competitor said it wouldn’t even achieve that, let alone allocative and dynamic efficiencies. The CAT agreed with the competitor on this. The following extract overviews the position (and the CAT largely agreed with what Dr Marshall said for *Albion*)⁴³:

Professor Armstrong [for the incumbent] saw “efficient entry” in terms of the assumption that lay behind his model, and indeed the Authority’s whole approach, which was that under ECPR market entry was only “efficient” if it could take place without increasing the water industry’s total costs in the short run. In other words ECPR aimed for “productive efficiency” in the short run, but neither “allocative” nor “dynamic efficiency”, even if entry might reduce costs over the longer run. Dr Marshall [for the competitor], on the other hand, saw ECPR as likely in practice to preclude entry by firms who would, by any normal standards, be regarded as “efficient”. In her view, ECPR was unlikely to achieve even the theoretical “productive efficiency” relied on by the Authority. More importantly, according to Dr Marshall, ECPR was unlikely in practice to foster the competitive process, or lead to gains in terms of lower costs, lower prices, better service or more innovation. In other words, in technical terms, as Dr Marshall saw it, ECPR would not achieve “allocative” or “dynamic” efficiency either.

⁴⁰ October judgment para. 650.

⁴¹ October judgment para. 657-658. The CAT however noted the respective merits of these 3 types of efficiency must be considered in the particular circumstances of the industry such as proper funding (and sharing of cost) for infrastructure and public service obligations (October judgment; para. 666)

⁴² October judgment para. 664.

⁴³ October judgment para. 665.

Professor Armstrong, for his part, emphasised that ECPR was solely concerned to achieve “productive efficiency”, emphasising the role of the regulatory process in controlling prices and thus achieving “allocative efficiency” by that route.

15.4 We will return to the dynamic efficiency below.

16 *Albion*: the international experience with retail-minus

16.1 The Tribunal tracked the history of retail-minus following the *Telecom v Clear* decision in the early 90’s, and the formulation of the Baumol-Willig Rule.⁴⁴ It concluded that there was little adoption of retail-minus internationally, referring to OECD material on the topic (this mirrors the Commission’s own conclusions including in Determination 497). The CAT referred to the international experience with ECPR/retail-minus; the considerable controversy it attracts (academically and as a matter of regulatory practice); and a US Supreme Court decision confirming that the FCC decision had not acted unreasonably in preferring a costs-based pricing model instead of suggested alternatives other than ECPR.

16.2 The Tribunal concluded that, against that background, ECPR should not be accepted without careful scrutiny (but it will depend on the facts of the case).

17 *Albion*: Can there be price squeeze when the retail-minus model is applied?

17.1 In *Albion*, the regulator had applied a retail-minus methodology. It claimed (as did the incumbent) that retail-minus pricing in itself meant there was no price squeeze. The Tribunal rejected this on the facts of the case, as the implementation of retail-minus was incorrect.

17.2 It is possible in some circumstances that the retail-minus methodology will comply with the price squeeze test but this will frequently not be so. Correct application of the “*avoided costs*” principle in the retail-minus model is not a basis on which the margin squeeze test is met. That test is different.⁴⁵

17.3 The Commission, in its Select Committee submissions, came to a similar conclusion (that a retail-minus may be conducive of price squeeze depending on the circumstances and does not necessarily avoid it).

17.4 Noteworthy is the Tribunal’s observation that a competitor facing pricing on a retail-minus basis generally will need to be “*a super efficient*” provider, not just an “*efficient*” provider.

17.5 Regulators have been grappling with the failure of “*standard*” retail-minus to meet price squeeze concerns. They have come up with ways to minimise the problem (eg: the broadband solution in Ireland). Generally, however, they have moved away from retail-minus pricing for this and other reasons.

18 *Albion*: Retail-minus often preserves monopoly profits, inefficiencies and cost misallocations

18.1 The Tribunal came to this conclusion, in answering the first of the five potential criticisms noted above. It therefore said that an essential partner for retail-minus, where there is SMP, is regulation of the retail price.

18.2 It noted there was largely no dispute on this.

18.3 This appears to be generally accepted including by the original authors of the model (Professors Willig and Baumol), and Dr Kahn. It is also recognised in

⁴⁴ October judgment para. 724-739.

⁴⁵ *Albion* December judgment, para. 305.

the *Telecom v. Clear* Privy Council case. There the Privy Council noted that in New Zealand, there was the ability to regulate the retail price.

18.4 As the Tribunal concluded:

It does not seem to be disputed in this case that an ECPR approach to access prices needs to be accompanied by a system for the regulation of retail prices which ensures a reasonable relationship between those prices and the costs of supply....The essential reason is that if the retail price which forms the basis for the "retail-minus" calculation already contains excessive profits, or reflects inefficiencies, or reflects costs that have been misallocated, the risk with an ECPR approach is that all those "monopolistic" consequences are simply embedded in the access price and passed on to the new entrant in that price. As Dr Marshall [expert for Albion] points out, and we accept, if such is the case even the "productive efficiency" theoretically sought by ECPR will be compromised by the continuing misallocation of resources implicit in the retail price used in the ECPR calculation....Professor Armstrong [expert for the incumbent] also accepted Dr Marshall's position that, in practice, ECPR must be accompanied by effective price regulation. He expressly accepted that ECPR is only a "partial rule"⁴⁶

19 **Albion: the Competitor often needs to be "super-efficient" (and the incumbent's insulation from competition)**

19.1 One of the key problems with retail-minus/ECPR is that it insulates the incumbent from competition as it requires the new entrant to indemnify the incumbent indefinitely for any loss of revenues (except for "avoidable costs"). This effectively requires the new entrant to support both the incumbent's overheads as well as its own. Thus, even if the "minus" calculation is correctly undertaken (it was not in the *Albion* case), the new entrant often has to be "super-efficient" as compared with the incumbent.⁴⁷

19.2 While the Tribunal was able to deal with the matter on its own facts⁴⁸ (including the zero reduction for avoidable costs), a firm theme emerges, which is critical of the ECPR approach in this respect.

19.3 Of course each case will differ and in some cases the "minus" and other circumstances may be sufficient to enable a merely "efficient" competitor to compete⁴⁹. But the need for the competitor to meet all its fixed and direct costs out the margin created by the incumbent's assumed margin for avoidable costs is a heavy burden, frequently requiring "super-efficiency". The CAT noted this can have the following effect⁵⁰:

Having, as it were, given with the one hand by opening the market to competition, there is a risk of taking away with the other hand if the conditions of entry are drawn so tightly that competition never occurs. In such circumstances, the benefit of competition would never be realised.

19.4 In coming to this conclusion the CAT emphasised the interests of the consumers and the advantages of choice and competition.

20 **Albion: Dynamic effects of Competition**

20.1 We return to this issue. This is a particularly important part of the analysis, given the importance of dynamic efficiency in an analysis such as this.

⁴⁶ October Judgment para. 740-742.

⁴⁷ See for example the summary in para. 32 of the October judgment.

⁴⁸ October judgment para. 762 to 781.

⁴⁹ The facts in *Albion*, with its zero "minus" deduction is at the extreme.

⁵⁰ October judgment para. 768.

- 20.2 The CAT concluded that retail-minus/ECPR is not conducive of dynamic efficiencies and that there are other ways of achieving the right balance.⁵¹
- 20.3 The Tribunal said that ECPR bankrolls all the incumbent's costs and insulates it from the disciplines of the market indefinitely. This creates a one-sided market in which the incumbent does not compete but the new entrant bears all the risks. This, said the Tribunal, is very far from normal competitive conditions. ECPR does not aim to produce dynamic efficiency benefits normally associated with competitive process.⁵²
- 20.4 This leads to a central conceptual problem according to the Tribunal⁵³. The pro-competition legislation in the Competition Act 1998 (UK)⁵⁴ is concerned with effective competition which tends toward lower costs and prices than prevail under monopoly conditions (likewise in New Zealand). Although the entry of a further competitor may to a certain degree add to total costs in the short run, the general assumption of competition policy is that in the longer run the competitor process will lead to lower costs overall. Thus there is a potential clash between the narrow short run productive efficiency sought in theory.
- 20.5 The Tribunal said of this central conceptual problem⁵⁵:

The proponents of ECPR consider the main goal to be to minimise any risk of raising total costs of supply in the short run; only if this is achieved is entry deemed to be "efficient" under ECPR.As Professor Armstrong says: "efficient entry by definition is entry that is profitable under ECPR" On the other hand, the Chapter II prohibition [the pro-competition legislation in the Competition Act 1998] is concerned with effective competition, that is to say the whole competitive process affecting price, service, innovation and customer choice. That process, in general, tends towards lower costs and prices than prevail under monopoly conditions. For that reason practices by monopolists which restrict or distort the conditions for market entry are scrutinised with care under the [pro-competition legislation].....

....Although the entry of a further competitor may to a certain degree add to total costs in the short run, the general assumption of competition policy is that in the longer run the competitive process will lead to lower costs overall. What the Authority describes as "the duplication" of fixed costs is not normally regarded as a problem. As Dr Marshall points out, in competitive markets a certain duplication of fixed costs is inherent in the fact that there are a number of competitors each of whom has their own costs and overheads. But, in normal circumstances, competitive markets will still produce goods and services at lower costs than will be the case if the market is monopolised. Similarly, we would be reluctant to assume, as does the Authority, that there is little scope for innovative developments in the water industry. ...In those circumstances it seems to us that there is a potential clash between the narrow short run productive efficiency sought in theory through ECPR, and the wider dynamic competition benefits and level playing field which the Chapter II prohibition is designed to safeguard. At the very least, a pricing policy which insulates the incumbent in perpetuity from competition; which requires the new entrant to support the incumbent's overheads as well as its own, and to indemnify the incumbent indefinitely against any loss of revenues (except as regards "avoided costs"); and which requires the

⁵¹ October judgment para. 797-803.

⁵² October judgment para. 762.

⁵³ October judgment para. 801-803.

⁵⁴ That is the Chapter II Prohibition

⁵⁵ October judgment para 802

new entrant to be “super-efficient” as compared with the incumbent requires close scrutiny under the Chapter II prohibition.

20.6 At para. 797 of the October judgment:

Dr Marshall expresses the view that ECPR as applied in the Decision [of the regulator] will “fatally compromise” any dynamic process of competition tending towards innovation, lower costs and lower prices, as envisaged in paragraph 24 of the Consultation Paper. Quite apart from the problem of passing through monopoly profits or inefficiencies in the access price, and the prevention of market entry, already discussed above, ECPR bankrolls all the incumbent’s costs and insulates the latter from the disciplines of the market indefinitely. This creates a one-sided market in which the incumbent does not compete, but the new entrant bears all the risks. We share Dr Marshall’s view that those are very far from normal competitive conditions. ...

It was not disputed on behalf of the Authority that ECPR does not aim to produce the “dynamic efficiency” benefits normally associated with the competitive process. The Authority accepted that ECPR does not expose the incumbent to any loss of profit, and does not give the incumbent the possibility of responding to competition. Ultimately the incumbent is indifferent as to who gets the business. As Professor Armstrong saw it, the incumbent remained passive, and was “not particularly active participant in the competitive process”..... It was not disputed by the Authority that under ECPR there was no parity between the entrant and the incumbent, the latter being insulated from the risk of competition in perpetuity. Mr Hope also accepted, very fairly, “there is no level playing field in terms of the costs position of the undertaker and of the entrant.” ...It was further accepted by the Authority that under ECPR a new entrant would need to be “super-efficient” as compared with the incumbent.

20.7 All these points are major deficiencies of ECPR and call for real care before the model is used.

21 **Albion: what about the incumbent’s need to recover sunk infrastructure and related costs, fund investment programmes and recover a contribution to common overheads?**

21.1 This is a variation on the same theme. The key point is that there are other ways of encouraging competition while encouraging investment by the incumbent. As the CAT said⁵⁶:

However legitimate the need to fund the industry’s infrastructure costs and protect ineligible customers from significant price increases, there is, side by side with that, a [pro-competition] policy decision to introduce the possibility of competition.....[T]here is a balance to be struck. If, as we have found above on the facts of this case, that balance is struck in a way which eliminates existing competition, or prevents virtually any new entry to the market, it is hard to see how any effective “balance” has been struck: on the contrary, in those circumstances the rules have been tipped all one way, in favour of the incumbents. In our view, however legitimate the objective of enabling the industry to fund its infrastructure and other relevant costs, the approach in the [regulatory Authority’s] Decision tends “to throw the baby out with the bathwater”. It does so by effectively eliminating any reasonable prospect of market entry. On the evidence in this case the approach in the Decision also maintains a retail price which is not shown to be cost-based and which the evidence strongly suggests to be excessive.

⁵⁶ October judgment at para. 806 to 808.

21.2 The Tribunal emphasised that the right balance could be struck in ways that did not involve the deficiencies of ECPR. The Tribunal said: “We have no reason to doubt Dr Marshall’s evidence that there are other ways of recovering infrastructure and related costs.”⁵⁷

21.3 There is a balance to be struck, said the Tribunal, and ECPR has the balance tipped all in one way, in favour of the incumbents. This, said the Tribunal, tends perhaps to “*throw the baby out with the bathwater*”.⁵⁸ It does so by effectively eliminating any reasonable prospect of market entry. The right balance could be struck in ways that did not involve the deficiencies of retail minus. There are other ways of recovering infrastructure and related costs.⁵⁹

22 Cost-based pricing: the traditional approach

22.1 As the Tribunal indicates in *Albion*, there are other ways of achieving appropriate regulatory outcomes that don’t have the deficiencies of retail-minus. Econet submits that the typical approach in New Zealand (initial pricing principle based on benchmarking against cost-based benchmarks with the final pricing principle set as TSLRIC) is capable of achieving appropriate regulatory objectives.

22.2 However, this is not ideal and the opportunity can and should be taken to develop best practice pricing methodologies. The Commission has available to it two further options with which we now deal. One is a similar approach to the current typical approach in New Zealand (based on benchmarking and TSLRIC) but with added flexibility. The other is to give greater flexibility based on best practice.

23 Cost-based pricing: alternative approaches

23.1 In relation to UBS, the Commission has suggested an alternative cost-based approach which Econet considers is just as suitable for the pricing of roaming. This will achieve the regulatory objectives and appropriate section 18 outcomes.⁶⁰ However, Econet considers that it would be preferable for the Commission to take this opportunity, as it now can, to change the overall regulatory approach to pricing. It can move to greater flexibility along the lines adopted by the EU in respect of European NRAs. The difficulties of the past in respect of the pricing which have led to problems in the market, gaming, and the regulator having “*one hand tied behind its back*”, can be surmounted in this way. So, Econet’s primary submission is that a model should be developed in line with the EU approach, by which the regulator, during and after the determination phase, has an array of pricing options to implement. This, as with the following option, should create greater certainty than the prescriptive retail-minus approach, despite its flexibility (the retail-minus model is inherently flawed, and control of price (and therefore certainty) lies with the incumbent not with the regulator).

23.2 If however the Commission is not prepared to go that far at this stage, then the approach that it suggests in relation to UBS is appropriate as it achieves the appropriate goals including:⁶¹

23.2.1 “*Enabling access prices to cover the cost of supply*”;

23.2.2 “*Ensuring that the relative prices of access products deliver appropriate investment and entry signals*”;

23.2.3 “*Allowing flexibility and adaptability of regulatory intervention over time*”;

⁵⁷ October judgment para. 807.

⁵⁸ October judgment para. 808.

⁵⁹ October judgment para. 807.

⁶⁰ See Commission’s Select Committee submissions at para. 51-57.

⁶¹ See Commission’s Select Committee submissions para. 51-53.

- 23.2.4 “... allow the implementation of regulation in a way consistent with investment incentives of both the incumbent and competitors as well as with the promotion of competition.”
- 23.2.5 A greater coherence between the pricing principles applicable to co-location and roaming.
- 23.3 On this basis, in respect of UBS, the Commission sets out its approach at para 54. It has reflected this in the draft pricing principle at Table 2⁶². As UBS is to be priced relative to LLU, the Commission takes, as a starting point⁶³ the ability to “*have regard to*” LLU pricing and an updated calculation of the price due to change of circumstances. The next part of the principle deals with the additional costs of supplying UBS rather than LLU. Then there are two significant additions. The Commission is “*to have regard to*”:
- “(e) *the incentives on the access seeker to migrate from Telecom’s unbundled bitstream service or similar services to Telecom’s unbundled copper loop local loops;*
 - “(f) *any other matter that the Commission considers to be relevant to the setting of the price.*”
- 23.4 The key here is that there is basic pricing formula with some flexibility due to the ability to take into account change of circumstances and the overall requirement that the Commission “*have regard to all of the following matters*”. There is a balance between prescription and flexibility. Particularly important is the requirement to have regard to the incentives of the access seeker to migrate from UBS to LLU (and there is an obvious overlap in having a pricing principle in the roaming definition which has regard to the incentives of the access seeker to migrate from roaming to its own infrastructure in areas where there are not issues around economies of scale, density, and enduring bottlenecks. Allowing the Commission to have regard to “*any other matter that the Commission considers relevant to the setting of the price*” is also particularly important and material. At determination stage (and subsequently), the Commission can make decisions that best suit the objectives.
- 23.5 Government of course did not accept that there should be a change in retail-minus pricing in respect of UBS. The Commission’s submission on this point was not accepted. However that does not mean that this approach is inappropriate in these new circumstances (roaming) taking into account all of the matters raised in those submissions and in these submissions. See also the Wigley UBS Pricing article: *Problems for NZ’s UBS Pricing Apparent*.
- 23.6 Of particular note is that the decision of the Competition Appeal Tribunal in *Albion*, which was not available (in respect of the December judgment) or appears not have been considered (the October judgment), at the time the Telecommunications Act was amended.
- 23.7 The Commission has an opportunity to move forward on a different basis, even if it does not go as far as best practice (allowing the regulator to have flexibility in the pricing model it chooses during the determination phase).

⁶² See Commission’s Select Committee submissions at para. 54.

⁶³ See Commission’s Select Committee submissions at para. (a)-(c) of Table 2.

APPENDIX 2

Roaming Case Study: Ireland

The EU Commission and ComReg Ireland opened up the Irish mobile market by threatening wholesale MVNOs

Meteor entered the market as the third entrant with penetration at 65%. Meteor's coverage was limited to less than 50% of the population (the three main cities) and there was no entitlement to national roaming.

Ireland was a mature market with two large operators (now Vodafone and 02/Telefonica). Meteor was immediately perceived as being an inferior network as it did not have the full coverage that the established networks offered.

Over the next three years Meteor struggled to compete as Vodafone in particular spent significant amounts marketing their 'full coverage' advantage. The network became valuable only to young, low disposable income customers aged 15-25, who needed low-cost calls and were not interested in geographic coverage outside the cities.

Even though coverage improved, the roll-out concentrated on urban areas and the total coverage map showed significant geographic areas with no coverage. Unable to 'paint the map' Meteor continued to struggle. Despite considerable investment it could only attain 5% market share after three years. At this point only 1% of Meteor's base was bill-pay. The 99% that were prepay were low ARPU customers.

The introduction of Full Mobile Number Portability (FMNP) was achieved through 'regulatory threat'. It had a positive impact on Meteor's ability to attract customers from Vodafone and O2. Without FMNP, Meteor would have struggled to reach the 5% market share mark.

Meteor's apparent failure in the market led the Regulator to pursue a joint dominance case against Vodafone and O2. Using the market analysis process of the new European Regulatory Framework the Regulator found that dominance existed and it proposed remedies including mandatory national roaming and mandatory MVNO access.

The threat of wholesale unbundling of the mobile network will normally serve to prevent abuse of SMP

Faced with the threat of mandatory MVNO access, O2 entered into national roaming negotiations with Meteor. The aim was to complete a commercial deal that would lead to Meteor becoming a viable competitor in the market, and so remove the potential for the mandated MVNO remedy.

At the time, the roaming rate was unimportant to Meteor. The aim was to 'paint the map', and compete against the two incumbent operators on a level playing field for the first time.

Meteor had rolled-out its own coverage to 85% of the population. So the national roaming deal allowed Meteor to offer, and advertise, national coverage for the first time.

The national roaming deal was signed for a 30-month period during which time Meteor intended to build its own network in the national roaming area.

27 months later, Meteor had grown its market share from around 5% to almost 17%. Subscriber numbers had grown from 240,000 to 750,000. Market penetration had grown from 86% to 104%, making it clear that competition from a 'level playing field' third operator had grown the market.

During this period Meteor took the largest share of net subscriber additions and developed its subscriber base from 1% to 10% bill pay. The brand was aged and overall customer demographic moved from 15 to 25 age group to 15 to 35 age group. As bill pay penetration increases this is now moving to a 15 to 45 age group.

Ireland's 3rd operator became the catalyst for improved end-user benefits

Meteor became recognized as the driver of competition in the market. In 2006 alone, it added 250,000 net subscribers to its network. At the same time competition in all sectors meant that retail rates came down, ARPU's came down and Minutes of Usage went up.

By the end of 2006 Vodafone reported its first drop in ARPU's in the Irish market. Its market share had dropped from levels similar to Vodafone NZ, to 48%.

The Regulatory threat of mandated national roaming access and mandated MVNO access led to a commercial national roaming agreement that brought real competition to the market and broke down joint dominance.

In addition to the impact on retail competition it also stimulated wholesale competition.

Meteor's growth was so swift that roll-out was concentrated on bringing capacity to the urban areas rather than the national roaming area. A new national roaming contract was therefore required and Meteor successfully established a competitive process that led to a new national roaming deal in the second half of 2006. Under this agreement, Meteor achieved improved commercial terms and switched wholesale providers, agreeing a new national roaming deal with Vodafone.

APPENDIX 3

Roaming Case Study: Slovenia

Slovenia is an EU Member State that now has only two mobile operators. It had three but the third entrant, following a struggle against overpowering dominance, closed down.

The failure of Vega in Slovenia is a stark reminder of the difficulties faced by third entrants in markets where regulation does not support market entry and the development of retail competition.

In Slovenia the incumbent, the mobile arm of the State fixed line incumbent, had over 80% market share. Despite this, it had the lowest return on capital of any telecommunications provider in an EU Member State.

Closed-network pricing has been the cause of the 3rd entrant failure

The second operator is owned by Telecom Austria and is a Vodafone branded operator. Despite its pedigree and resources, this operator has always found it difficult to break the dominance of the incumbent. It has less than 20% market share and continues to struggle today.

Vega did have the benefit of national roaming. Therefore coverage alone was not its difficulty. The problem was that national roaming was provided by the incumbent which then used on-net pricing to squeeze the third entrant.

National roaming was available everywhere, not on a LAC by LAC basis. Therefore, Vega customers would deliberately roam on the incumbent's network even when Vega coverage was available. This was because Vega's indoor coverage was not as good as the incumbents. This occurred as the inability to gain market share made further investment in the network an impossibility.

Vega paid a national roaming wholesale charge while the incumbent continued to offer on-net tariffs that amounted to foreclosure. The situation became impossible. Even Vegas' own employees, who had free phones, carried a second mobile from the incumbent because their friends would not pay the high charges for an off-net call.

APPENDIX 4

Roaming Case Study: other countries

Austria

A 3G operator with a 2G licence must make national roaming available to other 3G licensees without a 2G network once the 3G newcomer has reached a penetration of 20% of population (§ 133 (6) of TKG 2003).

On Sep. 10, 2002 Mobilkom and Hutchison 3G concluded a 3G-2G national roaming agreement.

Greece

Telecom Act 2867 of 2000 introduces an obligation to all mobile operators to enter into national roaming agreements within one year from its entry into force (Jan. 1, 2001).

EETT decision 218/36 states that existing operators of mobile public telecommunication networks must enter into national roaming agreements by Dec. 31, 2001.

A national roaming agreement was signed between Vodafone and Info Quest in Feb. 2002, based on commercial negotiations.

Italy

All 3G licensees operating a 2G network must offer 3G new entrants national roaming on fair, non-discriminatory and transparent terms for 30 months across the whole of the national territory, and for up to 60 months in provincial capitals not covered by the new entrant (according to the coverage commitments contained in the new entrant's licence).

3G licensees operating a 2G network and notified as having SMP under the previous regulatory framework (TIM and Vodafone) are required to offer 3G-2G roaming as above at cost-oriented charges.

AGCOM [Decision 388/00/CONS](#) on 3G licensing procedures (Art. 5).

Wind has a commercial 2G-2G roaming agreement with Vodafone limited to certain remote areas.

'3' had a commercial 3G-2G roaming agreement with TIM for voice and GPRS services until June 2006.

IPSE (no longer active, licence to be revoked) had an agreement with Vodafone.

Spain

Art. 10 h) of [Royal Decree 2296/2004](#) of Dec. 10, 2004 on electronic communication markets, access to networks and numbering establishes that SMP operators can be imposed an obligation to provide national roaming (no differentiation between 2G/2G and 3G/2G roaming)

The agreement between Vodafone and Xfera was concluded due to regulatory obligations ([3G licence conditions](#)).

2001: 2G/3G agreement between Vodafone and Xfera ([renewed](#) in Sep. 2006).

United Kingdom

On March 1, 2005 Ofcom [decided](#) to continue, for the time being, the application of a national 'roaming condition' in the mobile PTO individual licences of O2 and Vodafone requiring the provision of 3G-2G national roaming to '3' in specified circumstances.

For details, see [Big Five Update No 57](#).

In Dec. 2001 '3' reached a commercial agreement with O2 for 3G-2G roaming (incl. GPRS).

'3' also announced that it has awarded a contract to Orange to terminate calls to its subscribers when they are out of coverage.

APPENDIX 5

900 MHz Spectrum

New Zealand is the only OECD country where one company holds a 900 MHz monopoly

- 1 **Introduction:** Spectrum holdings are essential components of this Schedule 3 investigation. Existing operators are holding excessive spectrum and are unlikely to make it available to new entrants at appropriate prices.
- 2 The MED is reviewing 900 MHz spectrum management rights up for renewal in 2011 and 2012. By the time the Commission makes its decision on the Schedule 3 investigation, it is likely that the Minister will have decided what to do in relation to the renewal rights. EWNZ and TelstraClear have submitted that existing operators should not be permitted to maintain their spectrum monopolies on renewal.
- 3 Even if the management rights are not renewed, that still leaves the management rights unavailable until 2011/2012. That is beyond the period of 2-3 years which is the normal period of review by the Commission when it undertakes market assessments. It is also beyond the period in which a new network can be expected to be developed using the 900 MHz spectrum.
- 4 EWNZ is particularly interested in the 900 MHz spectrum held by Vodafone, for reasons articulated in §56 of our submission. The history so far indicates that, without regulation or regulatory pressure, it is unlikely that Vodafone will release spectrum at appropriate pricing. As Vodafone owns the Management Rights for this spectrum, it has the ability to grant 900 MHz licenses to other parties until 2011/2012. But it has not done so.

We support the Commission's view regarding barriers created by 900 MHz allocation

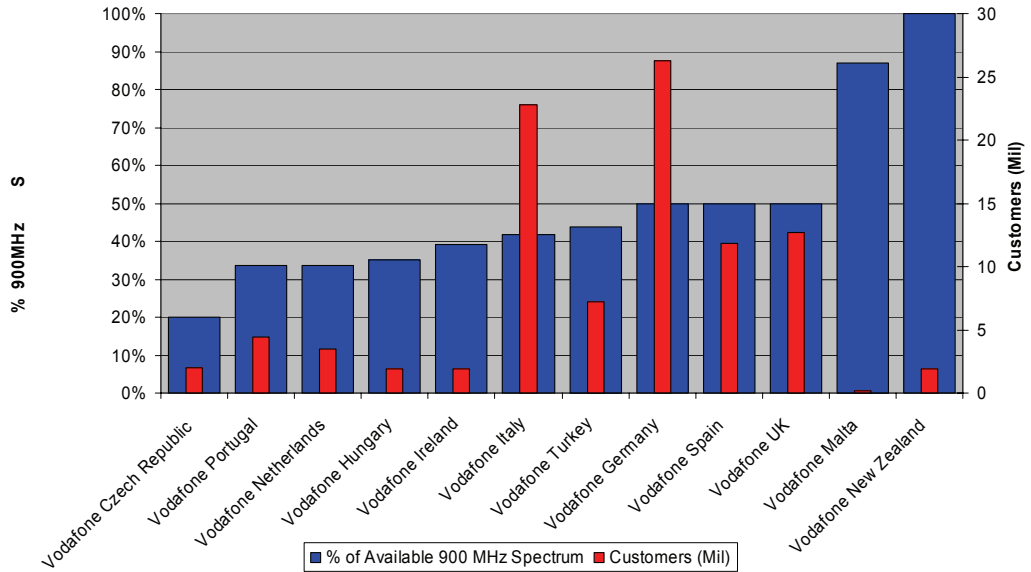
- 5 The Commission has recognised this problem:¹

The unavailability of spectrum in the 850/900 MHz range for new entrants is a barrier to entry as it raises the cost of entry. The Commission notes that incumbents appear to hold in excess of the requirements for providing actual current and future services, given New Zealand's characteristics. The problem could be rectified however, if a new entrant could gain access to spectrum without having to buy the spectrum from the incumbents, or if incumbents do not have access to more spectrum than they require. The Commission considers that incumbents for strategic reasons may want to restrict new entry and limit competition in the market for mobile services by restricting access to spectrum.
- 6 **Vodafone International Experience:** The Commission's conclusion, that the incumbents appear to hold more than is required for current and future services, is illustrated by the following graph in respect of Vodafone. This graph compares spectrum held by Vodafone in European countries and New Zealand, as against Vodafone subscribers in each of those countries.²

¹ *October Report*, para 206.

² Figures on the graph sourced from European Radiocommunications Office "ERO Information Document on GSM Frequency Utilisation within Europe" (updated December 2005) <http://www.ero.dk/fc2e8966-1db9-445b-a8d5-e5c7cf825cc2>. New Zealand data obtained from MED SMART Radio Spectrum Management database (<http://www.rsm.med.govt.nz/pls/web/dbssiten.main>) and from World Cellular Information Service (<http://www.wcisdata.com>).

Vodafone Group 900MHz Spectrum vs Customer Numbers



Existing spectrum use is inefficient and contrary to international best practice.

- 7 The Vodafone use of existing spectrum is inefficient and is not representative of international best practice. This is illustrated by spectrum use within the international Vodafone group, as demonstrated in the graph.
- 8 There are 12 Vodafone networks listed in the graph. There are a total of 17 networks worldwide in which Vodafone has a controlling interest. The data for the remaining five networks is either outdated (3 networks), unavailable (1 network) or not in a usable form (1 network).
- 9 Excluding New Zealand, the average gross spectral efficiency of these networks is 389,000 Customers/Paired MHz of spectrum (including both GSM 900 and GSM 1800 spectrum).
- 10 The Vodafone New Zealand network currently achieves a gross spectral efficiency of 54,000 Customers/Paired MHz (including both GSM 900 and GSM 1800 spectrum).
- 11 It is helpful to consider a Vodafone network with a similar total country population and a similar number of customers. Ireland is an example of this (both New Zealand and Ireland have populations around 4 million). The Vodafone Ireland network supports approximately 1,890,000 customers on 21.9 MHz of spectrum. This yields a gross spectral efficiency of 86,000 Customers/Paired MHz of spectrum. Notable is that the breakdown of the spectrum available to Vodafone Ireland is 7.5 MHz of GSM 900 MHz and 14.4 MHz of GSM 1800 MHz.
- 12 Approximately 40% of the Irish population lives within the greater Dublin Area (the largest cellular market), which is roughly similar to the greater Auckland area (33% of the New Zealand population and also the largest cellular market). The two areas are of roughly equivalent size. In cellular networks, the most customer-dense areas (usually this corresponds to population density) will drive the total requirement for spectrum, or more significantly, the need for more efficient utilisation of the available spectrum.
- 13 If Vodafone NZ achieved the Irish level of spectral efficiency in NZ, the required spectrum would be approximately 22 MHz, consisting of 15 MHz GSM1800 MHz and 7 MHz GSM 900 MHz. This is very similar to the Irish allocation.

There is no remaining justification for maintaining the 900 MHz monopoly

14 There is no justification for Vodafone to maintain a monopoly on the available GSM 900 MHz spectrum. In competitive spectrum-limited situations, the graph shows that other Vodafone networks are achieving significantly higher spectral efficiencies (the only exception is Malta).

15 We note also that Vodafone does not heavily utilise its existing allocation of 2 x 15 MHz of GSM 1800 MHz spectrum. Records in the MED SMART radio licensing database indicate that Vodafone currently has 1,191 operational GSM 900 sites. The same records also indicate that there are only 108 of these sites (fewer than 10%) that have operational GSM 1800 transceivers. Therefore it is clear that Vodafone New Zealand has a considerable capacity to further utilise its GSM 1800 MHz spectrum, to carry traffic in the more traffic dense areas.

Vodafone has no incentive to license or transfer its 900 MHz spectrum rights to a potential competitor

16 **Lack of trading and secondary market:** Apart from Vodafone's acquisition of some 900 MHz spectrum from TelstraClear in 1997 (to achieve its monopoly 900 MHz holdings), no 900 MHz secondary market trading has occurred, nor has Vodafone used its management rights to license spectrum to third parties. The Commerce Act is, in practical terms, ineffectual to remove the monopoly interest. The incumbent has strong incentives to retain control:³

Management rights spectrum can be sold to service providers ('rightholders') and subsequently traded between them. An underlying assumption, that market mechanisms will ensure spectrum is allocated to its highest value use, has not necessarily been realised in practice.

17 Vodafone is heavily incented to retain the entire spectrum and not transfer rights or license them to a third party. The Commerce Act has failed to stop that situation. While Vodafone faces the cost of retaining more spectrum than it needs, that cost is small in comparison with the benefit of spectrum retention (keeping competition out of the market). This is illustrated by MED's observation in its 2005 Radio Spectrum Review:⁴

Although spectrum is a critical business asset, its costs are negligible compared with the cost of establishing infrastructure and the potential return from the sale of services. The price and availability of spectrum is not, therefore, a major item in the balance sheets of cellular service providers.

18 **Vodafone's June 2006 commercial offer**

18.1 Vodafone and EWNZ are currently in discussions for the acquisition of 900 MHz spectrum. While the investors' involvement is a key component, EWNZ considers that realistic discussions will not be possible without the regulatory pressure referred to in the body of these submissions.

18.2 The last offer, to sell management rights in 900 MHz spectrum, was made to EWNZ in a Vodafone letter of 14 June 2006, to which EWNZ replied on 28 June.

18.3 The offer, for Management Rights in 2 x 7.6 MHz,⁵ for the remaining 6 years to 2012, was \$16.72M. On page 2 of its offer letter, Vodafone said:

The Purchase Price is based on the weighted average price that Vodafone has paid (ie; the cost to Vodafone) for 900 MHz spectrum management rights. It takes into account the rights of renewal which are conferred on the incumbent.

³ Ministry of Economic Development "Review of Radio Spectrum Policy in New Zealand 2005" (April 2005) para (v) in the Executive Summary.

⁴ Ministry of Economic Development "Review of Radio Spectrum Policy in New Zealand 2005" (April 2005) para 192.

⁵ MR 39 and 40: the spectrum bought from TelstraClear.

- 18.4 This cost-based approach to spectrum was also confirmed in a press release in October 2006 by Vodafone's Regulatory Manager (in response to release of the Commission's Mobile Services Review).⁶

Mr Glass says Vodafone has standard terms and cost-based pricing, uses an industry-agreed process for co-location, [and] has offered spectrum to a new entrant at a cost-based price

- 18.5 In Appendix A of Vodafone's 25 August 2006 submission to MED on cellular spectrum renewal rights,⁷ Vodafone notes that the price paid for each 2 x 15 MHz block was \$33.2M. This translates to \$16.8M for the equivalent of 2 x 7.6 MHz. With 6 out of 20 years to run, and taking the cost approach adopted by Vodafone, the price of the remaining 6 years is \$5.0M (6/20 x \$16.8M).
- 18.6 It is inconceivable that the value of the renewal rights beyond 2012 could be the balance of the \$16.7M (namely \$11.7M). This is neither a cost-based proposal nor a commercially realistic proposal.
- 18.7 EWNZ responded, relying on the information then available to it, in its letter of 29 June. This was followed by telephone confirmation that the \$16.72M offer price was non-negotiable.⁸
- 18.8 Additionally, the offer was also made when Vodafone knew that EWNZ did not have the funds to acquire it at anything like this price.
- 18.9 This demonstrates two points:
- 18.9.1 Unequivocally clear is that Vodafone does not require the 2 x 7.6 MHz (around a third of its 900 MHz holdings). This at least can be reallocated.
- 18.9.2 A commercially realistic proposal was not forthcoming, despite claims to the contrary.
- 18.10 In these calculations we have relied, in Vodafone's favour, on Vodafone's own figures in its submissions. However, EWNZ's calculations, in the 28 June letter in Appendix 4, produce a cost price of \$3.67M instead of \$4.95M, which would further indicate that the offer does not reflect the methodology put forward by Vodafone, nor does it represent anything like a reasonable offer.

⁶ http://www.vodafone.co.nz/aboutus/media_releases/20061010.jsp

⁷ <http://www.med.govt.nz/upload/39923/01.pdf>

⁸ Note of telephone discussion Tom Chignell/Andrew Davis (3 August 2006).

APPENDIX 6

Network Elements

1 Introduction

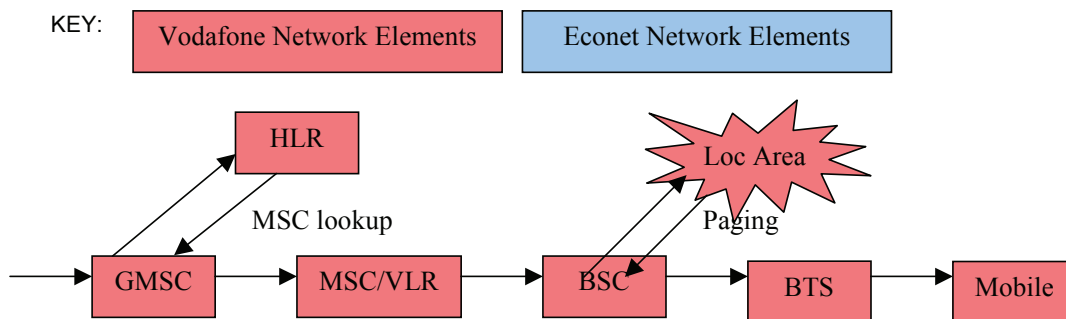
- 1.1 In this Appendix, we overview, in the following order, the elements in the following services (acronyms are explained in the Glossary at Appendix 1):
 - 1.1.1 Mobile terminating calls (MT)
 - 1.1.2 Roaming terminating calls (MT(R))
 - 1.1.3 Mobile originating calls (MO)
 - 1.1.4 Mobile Originating roaming call (MO(R)).
 - 1.1.5 Location and Mobility Management

2 Mobile terminating call, MT

- 2.1 Mobile termination is used to describe an incoming call to a mobile subscriber, from the point at which it enters the mobile network. The call can be originated from any other network (fixed or mobile) but this does not change the way in which the call is handled once it reaches the mobile network. Where a mobile subscriber in the same network originates the call, the call can be broken up into two legs: the originating and terminating legs. That second leg is described in this section. The process described here applies to a call destined for a subscriber registered in his or her home network and within his or her home network coverage.
- 2.2 The terminating call is always received at a Gateway switch, or MSC (GMSC). In order to route the call, the GMSC must know where the subscriber is located within the mobile network. It therefore requests this information from the Home Location Register (HLR). The HLR keeps track of the switch (the visited MSC) serving the area where the subscriber was last registered. When it receives the request from the GMSC, it contacts the relevant MSC/VLR and requests a roaming number (MSRN). It provides this information back to the GMSC.
- 2.3 The MSRN is a temporary phone number used to route the call from the GMSC to the MSC/VLR serving the area where the subscriber is located. Once the call is routed, the MSRN is no longer required and can be returned to a pool of available numbers. It is important to note that, in many cases, the serving MSC/VLR can be the same as the GMSC that first receives the call. However, it is also possible that the MSC/VLR is located some distance from the GMSC. In the second case, the MSRN is needed to route the call across country, either via the mobile operator's internal network, or potentially via a third party transit network.
- 2.4 When the call arrives at the MSC/VLR, the VLR determines if the call is allowed (in terms of the service profile of the subscriber). If allowed, the current location area (LA) registered within the VLR is used as the basis for a request for a channel to be set up to the destination mobile. The Base Station Controller responsible for that location will cause a broadcast signal to be sent from every base station in the location area (LA) (this signal is known as 'paging'). The mobile will respond to the page through the particular base station (BTS) it happens to be listening to, and the BSC will establish a radio channel to the mobile through that BTS (once the subscriber answers the ringing). The BSC

then informs the MSC/VLR, and the call is routed through to the subscriber, via the BSC and the BTS.

- 2.5 The process above is the simplest scenario. It assumes that the destination mobile is switched on, registered in the network and still located in the location area where it last registered. If it has moved (or dropped out of coverage), it might be necessary for progressively larger portions of the mobile network to be paged in order to locate the subscriber, culminating in a network-wide page.
- 2.6 The reason that the process above is followed, rather than the shot gun approach of paging the whole network for every incoming call, is simply one of signalling capacity and efficiency. Location areas (LAs) can be configured on the network so as to manage the required amount of signalling on the network to a reasonable level.
- 2.7 The diagram below shows the process described above for a call to a Vodafone subscriber on the Vodafone network. The HLR is not involved in the call once it has been established.

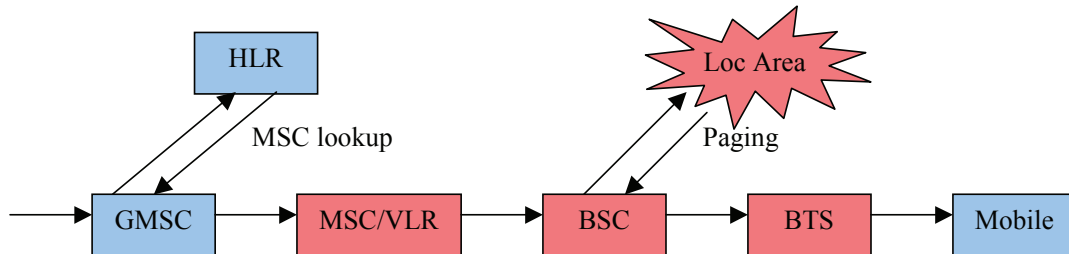


3 Roaming terminating call, MT(R)

- 3.1 When an EWNZ subscriber leaves EWNZ coverage, and roams onto the Vodafone network, the handset will perform a location update in the new network. This causes the Vodafone MSC/VLR covering this area to register the EWNZ roamer in the Visited Location Register (VLR) database. The Vodafone MSC/VLR will communicate with the EWNZ HLR, in order to inform the EWNZ HLR that the subscriber is now registered on the Vodafone MSC/VLR, and in order to obtain information on the services permitted for this subscriber. This information is stored in the VLR, the same way that it would be for a Vodafone subscriber.
- 3.2 If a call is now made to this EWNZ subscriber, it will first arrive at the EWNZ GMSC. This is because the phone number (MSISDN) of the subscriber identifies it as an EWNZ subscriber. The EWNZ GMSC will follow the same procedure as described in the previous section, and request the routing information from the EWNZ HLR. As the EWNZ HLR knows that the subscriber registered with a Vodafone MSC, it will then contact the Vodafone MSC/VLR to obtain a roaming number (MSRN), and pass this back to the EWNZ GMSC.
- 3.3 This MSRN is a temporary number on the Vodafone network, and identifies the particular Vodafone MSC/VLR where the roamer is located. The EWNZ GMSC will use this information to route the call to the Vodafone MSC/VLR. Where the EWNZ GMSC and the Vodafone MSC/VLR are not in similar locations, it is possible for the call to be trunked:
 - 3.3.1 over the Vodafone internal network (at Vodafone cost), or;

3.3.2 either via the EWNZ internal network or a third party transit network (at EWNZ cost).

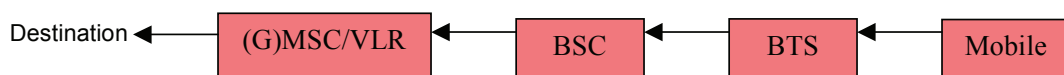
3.4 Once the call arrives at the Vodafone MSC/VLR, it follows the same process as for an MT call to a Vodafone subscriber. The call flow is shown below (where the blue elements are provided by EWNZ and the red by Vodafone):



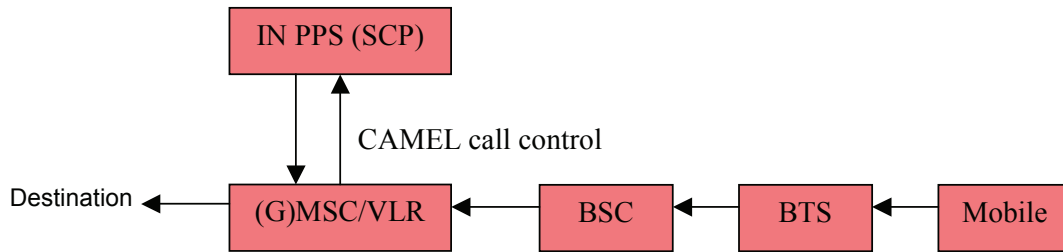
4 Mobile Originating call, MO

4.1 An originating call from a mobile network is somewhat simpler (than MT or MT(R)) because the network does not have to locate the mobile handset. Its location is obviously known from the time the call is initiated. The following process describes an outgoing call from a home subscriber already registered in and within coverage of his or her home network, in the simplest case of a post-paid subscriber.

4.2 When the mobile subscriber enters his or her desired number, the handset contacts the nearest BTS, and requests a call setup to the destination number. The BSC will send a call setup request to the MSC/VLR serving the area. If the service profile for the subscriber (stored in the VLR) permits the call, the BSC will allocate a radio channel for the call, and the MSC will then establish an outgoing call setup request to the destination number. When the call is answered at the destination, the network will connect the call through to the mobile handset. This is shown diagrammatically as follows:



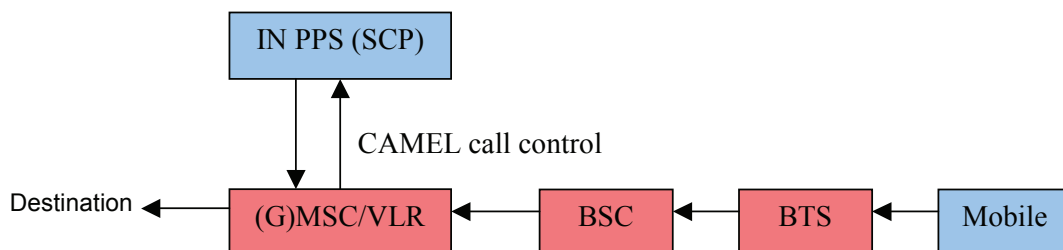
4.3 In the case of a prepaid subscriber, the normal method of implementation assumes an Intelligent Network (IN) platform for the control of prepaid calls. In this scenario, the service profile of the subscriber (stored in the HLR and copied to the VLR) will be tagged as an IN controlled subscription. When the call setup request arrives at the MSC/VLR, it triggers a check towards the Service Control Point (SCP) of the IN platform to determine what to do with the call (using CAMEL protocol). In the case of prepaid, the IN platform will instruct the MSC to allow the call to proceed (assuming sufficient credit). Other applications (e.g. Universal Number, Intelligent Call Forwarding etc) can also be implemented on the IN platform. The following diagram overviews this.



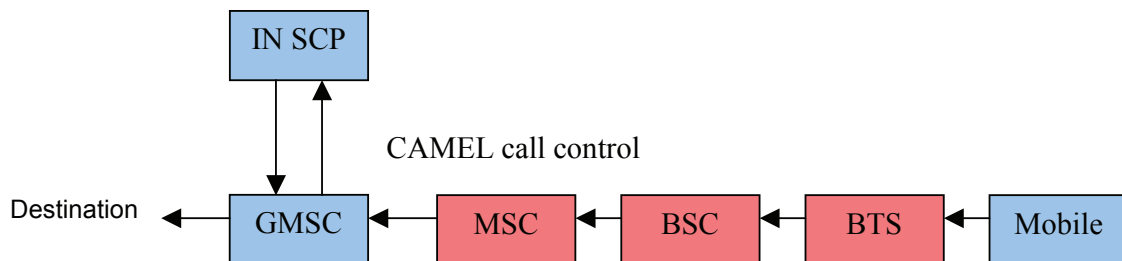
- 4.4 Normally, the MSC/VLR controlling the area in which the subscriber is located will act as a GMSC for outgoing calls (meaning it can directly route the call to destinations outside the mobile network). It will use a routing table to determine how to route the call, based on analysis of the destination number. If the destination is a mobile subscriber on the same mobile network, it will then proceed to handle the call as if it were a terminating (MT) call on the network as described above, starting with a check to the HLR for location/routing information.
- 4.5 Finally, in the case of a Mobile Number Portability (MNP) environment, a check to determine if a number has been ported (and how to route it) can be implemented either as an IN application, or more usually by implementing a check to the HLR for location/routing information (which may be intercepted by an MNP application built into the signalling network).

5 Mobile Originating roaming call, MO(R)

- 5.1 For a call originated by an EWNZ subscriber roaming on Vodafone, the call setup procedure is virtually identical to that for a home subscriber. The only difference for a post-paid subscriber is that the service profile in the VLR will have been retrieved from the EWNZ HLR at the time the subscriber registered on the Vodafone network. It is also likely that the visited network will need to implement a different routing table for the roamers to allow for implementation of services hosted within the home network.
- 5.2 For a prepaid roamer, using an IN Prepaid application, the scenario is again very similar to a prepaid subscriber in the home network. Assuming the use of mobile-specific protocol like CAMEL, prepaid can be implemented across networks, with the control of the subscriber remaining with the IN SCP in the home network. Thus the main difference in terms of prepaid roamers is that the IN SCP is located remotely to the network in which the roamer is being serviced (in the diagram, EWNZ elements are in blue and Vodafone elements in red).



- 5.3 There is an alternative option for handling traffic originated by roamers, applicable for both post-paid and prepaid traffic, as suggested by Vodafone in its undertaking. This calls for all outgoing traffic from the roamers to be routed back to the home network (EWNZ) for onward routing. This relieves Vodafone of the responsibility for implementing routing, number portability and prepaid decisions for any outgoing roaming calls. These decisions would then need to be taken by the EWNZ GMSC that handles the calls after they are handed over by Vodafone. This is shown below (in the diagram, EWNZ elements are in blue and Vodafone elements in red). It is clear that this alternative requires the utilisation of more resources with the EWNZ network than the first option.



- 5.4 For the alternative implementation, it should also be noted that in the case where the final destination is a number on the Vodafone network, the call will have to be handed back to Vodafone (often to the same switch from where it was received), and this second pass means the call therefore will produce higher utilisation within the Vodafone network as well as the EWNZ network. However, it is a simpler technical implementation, and may have some benefits in the form of a consistent user experience.

6 Location and Mobility management

- 6.1 The sections above have focussed on call scenarios for calls being made to and from mobile subscribers. Of course, subscribers do not make or receive calls all the time, but they still have to be managed as they move around the network, even while they are idle (particularly to keep track of their location).
- 6.2 The basic 'unit' of location, for the purposes of this discussion, is the Location Area (LA). A location area is a group of BTS with contiguous coverage, all of which are managed by the same BSC, although there may be multiple LAs within a single BSC. Each BTS will broadcast an LA code (LAC) that allows the handset to determine whether or not it is still within the same LA.
- 6.3 When a handset is first turned on, it will register with the network and perform a location update. In the process of the handset being authenticated (involving stored 'keys' in the SIM card and the home network Authentication Centre (AuC)), the MSC/VLR serving the area will request a copy of the service profile from the HLR and store this in the VLR, along with the current LAC for the subscriber. The HLR will take note of the MSC/VLR where the location update came from and update this entry in its own database.
- 6.4 When a handset detects (by virtue of the broadcast LAC) that it has left an LA and entered a new one, it will trigger a location update in the new LA. This new LA could be on the same BSC, or a different BSC but the same MSC/VLR, in which case the VLR will just update the stored LAC for the subscriber. If however the LA is under a new MSC/VLR (or even a new network in the case of roaming), the new MSC/VLR will trigger a location update process, which

updates the VLR in the new MSC, deletes the subscriber from the old VLR, and updates the pointer in the HLR to indicate the new MSC/VLR.

- 6.5 In this way the network can nearly always locate the subscriber within the correct LA. It is important to note that in the case of roaming (assuming an agreement is in place to permit it), the visited network MSC/VLR is treated just the same as a home MSC/VLR from the point of view of the home HLR and GMSC, and the roamer is treated just the same as a home subscriber.

APPENDIX 7

Glossary

900 MHz	As Econet's technology platform is GSM, Econet is particularly focused on the 900 MHz spectrum typically allocated for GSM services. Under most circumstances, use of 900 MHz can be read to include reference to 850 MHz spectrum, which would be of easier use for potential CDMA competitors.
BSC	Base Station Controller "The BSC is the functional entity within the GSM architecture that is responsible for RR (Radio Resource) allocation to a MS (Mobile Station), frequency administration and handover between BTS (Base Transceiver Station) controlled by the BSC. The equivalent function within the UMTS architecture is the RNC (Radio Network Controller). Source: http://www.mpirical.com
BTS	Base Transceiver Station "In cellular system the Base Transceiver Station terminates the radio interface. Each BTS may consist of a number of TRX (Transceiver). In the GSM system the BTS is also responsible for ciphering of the air interface." The equivalent function in the UMTS architecture is the NodeB. Source: http://www.mpirical.com
CAMEL	Customised Application of Mobile Enhanced Logic "CAMEL enhances GSM for the provisioning of international IN (Intelligent Network) services. ... CAMEL supports the availability of IN services internationally, across GSM networks." Source: Newton's Telecommunications Dictionary (22 nd edition)
Closed Network Pricing	A situation in which an operator charges separate rates for on-network calls (calls from one end-user of the operator to another end-user of the same operator) vs. off-network calls.
cpm	cents per minute (in New Zealand currency unless otherwise indicated)
Exclusion Zone	Used (in the context of mobile roaming) to describe a location area where (roaming) service is not permitted. A roaming handset (not engaged on a call) that enters an exclusion zone will be forced to look for another network to provide service (usually the Home network).
FTM	Fixed to Mobile
GMSC	Gateway Mobile Switching Centre "A Gateway Mobile Switching Centre provides an edge function within a PLMN (Public Land Mobile Network). It terminates the PSTN (Public Switched Telephone Network) signalling and traffic formats and converts this to protocols employed in mobile networks. For mobile terminated calls, it interacts with the HLR (Home Location Register) to obtain routing information." Source: http://www.mpirical.com
HLR	Home Location Register

“The Home Location Register is a database within the HPLMN (Home Public Land Mobile Network). It provides routing information for MT (Mobile Terminated Calls) and SMS (Short Message Service). It is also responsible for the maintenance of user subscription information. This is distributed to the relevant VLR (Visitor Location Register) or SGSN (Serving GPRS Support Node) through the attach process and mobility management procedures such as Location Area and Routing Area updates.”

Source: <http://www.mpirical.com>

IN	Intelligent Network A development in network architectures that allows the call control functionality to be separated from the call switching functionality and placed in a separate node where applications can provide more advanced services and features. Commonly used to provide prepaid services.
LocArea or LA	Location Area This is the basic “unit” of location. A Location Area is a group of Base Transceiver Stations (BTS) with contiguous coverage, all of which are managed by the same Base Station Controller (BSC). There may be multiple LA’s within one BSC. Each BTS broadcasts an LA Code (LAC) that allows the handset to determine whether it is still in the same LA.
MO(R)	Roaming Originating Where a roaming customer makes a call from the visited roaming network.
MMTR	Mobile-to-Mobile Termination Rates
MT	Mobile Termination
MTR	Mobile Termination Rate
MT(R)	Roaming Terminating Where a roaming customer receives a call on the visited roaming network.
MSC	Mobile Switching Centre “A mobile switching centre is a telecommunication switch or exchange within a cellular network architecture which is capable of inter-working with location databases” Source: http://www.mpirical.com
MSISDN	Mobile Station ISDN number “An ISDN number provisioned to a mobile station subscriber and used to place a call” Source: Newton’s Telecommunications Dictionary (22 nd edition)
MSRN	Mobile Station Roaming Number “This number is generated by the VLR ... of the terminating MSC. A switch providing services and co-ordination between mobile users in a network and external networks. It contains the location area identification code of the called subscriber. This number is used by the MSC for the routing of the call. For call routing MSC sends the call MSISDN number to the HLR which sends the corresponding IMSI number to the VLR which in turn generates the MSRN number and route it back to the MSC via SHLR” Source: Newton’s Telecommunications Dictionary (22 nd edition)

Node B	<p>“The Node B is the function within the UMTS network that provides the physical radio link between the UE (User Equipment) and the network. Along with the transmission and reception of data across the radio interface the Node B also applies the codes that are necessary to describe channels in a CDMA system. Analogies can be drawn between the function of a Node B and those of a BTS (Base Transceiver Station).”</p> <p>Source: http://www.mpirical.com</p>
Pocket Pricing	<p>The discounting of services in geographic areas or markets in which one party (usually an SMP) is subjected to competition from another in order to deny the competitor access to that market. This typically results in discriminatory pricing for end-users of the SMP (only those in which the SMP is threatened benefit from the reduced prices, at the expense of those not in an area of competition), and can drive out competitors.</p>
RNC	<p>Radio Network Controller Responsible for the control and allocation of radio resource used by attached handsets, and NodeBs within a UMTS network. See also BSC.</p>
Seamless Handover	<p>The handing over of a call (service or session) from one mobile network (or mobile network resource) to another without interrupting or dropping the call.</p>
SMP	<p>SMP means Substantial Market Power or Significant Market Power, as context requires, such as that term is used under the Commerce Act 1986, or the laws and regulations of the European Union or other foreign jurisdiction.</p>
UMTS	<p>Universal Mobile Telecommunications System The European (3GPP) standardisation of the 3G wireless phone system. Part of IMT-2000, UMTS provides service in the 2.1GHz band and offers global roaming and personalized features. Designed as an evolutionary system for GSM carriers, UMTS is based on WCDMA technology.</p>
UMTS 900	<p>UMTS using the 900MHz band (normally used for GSM) instead of the original 2.1GHz band.</p>
VLR	<p>Visitor Location Register “The visitor location Register contains all subscriber data required for call handling and mobility management for mobile subscribers currently located in the area controlled by the VLR.” Source: http://www.mpirical.com</p>
W-CDMA	<p>Wideband CDMA. A development of CDMA technology using wider carriers, typically 5MHz instead of the 1.25MHz used by CDMA.</p>

APPENDIX 8

Bibliography

ACCC Review of Mobile Domestic Inter-Carrier Roaming Service: *ACCC Review of Mobile Domestic Inter-Carrier Roaming Service*, Australia Competition and Consumer Commission, December 2004.

<http://www.accc.gov.au/content/index.phtml/itemId/333898>

Albion December Judgment: *Albion Water Ltd v. Water Services Regulation Authority and Dŵr Cymru* [2006] CAT 36, 18 December 2006.

<http://www.catribunal.org.uk/documents/Jdg1046Albion181206.pdf>

Albion October Judgment: *Albion Water Ltd v. Water Services Regulation Authority and Dŵr Cymru*, [2006] CAT 23, 6 October 2006.

<http://www.catribunal.org.uk/documents/Judge1046Albion061006.pdf>

Commission's CallPlus/ihug Reconsideration Report: *Draft Reconsideration of Decision 582*, Commerce Commission, 21 February 2007.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Wholesale/WholesaleDeterminations/ContentFiles/Documents/Draft%20Reconsideration%20of%20Decision%20582%20-%20Public%20version1.pdf>

Commission's Decision to Investigate Regulated Services: *Review of Designated and Specified Services under the Telecommunications Act 2001: Decision to Investigate*, Commerce Commission, 16 November 2005.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/Review%20of%20Regulated%20Services%20Decision%20to%20Investigate.pdf>

Commission's MTR Reconsideration Report: *Schedule 3 Investigation into Regulation of Mobile Termination: Reconsideration Final Report*, Commerce Commission, 21 April 2006.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/MobileTerminationRates/ContentFiles/Documents/Mobile%20Termination%20Reconsideration%20Final%20Report%2021%20April%202006%20.pdf>

Commission's Report on Extension of Regulated Services: "Schedule 3 Investigation into the Extension of Regulation of Designated and Specified Services: Final Report", Commerce Commission, 28 August 2006.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/Review%20of%20Regulated%20Services%20Final%20Report.pdf>

Commission's MTR Final Report: *Schedule 3 Investigation into Regulation of Mobile Termination: Final Report*, Commerce Commission, 9 June 2005.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/MobileTerminationRates/ContentFiles/Documents/MT%20Report%20PUBLIC%20version1.pdf>

Commission's Select Committee Submissions: *Submission to Finance and Expenditure Select Committee on the Telecommunications Amendment Bill 2006*, Commerce Commission, 11 August 2006.

http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/GeneralInformation/ContentFiles/Documents/492059_4.pdf

Issues Paper: *Telecommunications Act 2001: Schedule 3 Investigations into Amendments to the Roaming & Co-Location Services: Issues Paper*, Commerce Commission, 15 December 2006.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/Issues%20Paper%20Mobile%20Schedule%203%20Investigation%20into%20Roaming%20-%20Co-location%20-%20pdf%20version.pdf>

October Report: *A Review of Cellular Mobile Market Entry Issues*, Commerce Commission, 2 October 2006.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/final.pdf>

OECD 2002 Report: *Competition and Regulation Issues in Telecommunications*, OECD, 1 February 2002.

<http://www.oecd.org/dataoecd/48/39/1834399.pdf>

Vodafone Draft Undertaking: *Undertaking to Commerce Commission under Schedule 3A in respect of National Roaming and Co-Location Services*, Vodafone New Zealand Limited, 19 January 2007.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/voda%20undertaking.pdf>

Vodafone Submissions Supporting Draft Undertaking: Vodafone New Zealand Limited; 19 January 2007.

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/Investigations/ContentFiles/Documents/voda%20undertaking%20sub.pdf>

Wigley Price Squeeze article: Margin/Price-based Squeeze – A Landmark UK Judgment, January 2007.

<http://www.wigleylaw.com/Articles/LatestArticles/margin-price-squeeze---a-landmark-uk-judgment/>

Wigley Retail-Minus Pricing article: Retail-Minus Pricing (aka ECPR) Panned by UK's Competition Appeal Tribunal – Wigley & Company, January 2007.

<http://www.wigleylaw.com/assets/Attachments/retail-minus-pricing-panned-by-cat.pdf>

Wigley UBS Pricing article: Problems for NZ's UBS Pricing Apparent, January 2007.

<http://www.wigleylaw.com/Articles/LatestArticles/problems/>

WIK-Consult Report to ACCC: *Mobile Termination Cost Model for Australia*, WIK-Consult for the Australian Competition and Consumer Commission, January 2007.

<http://www.accc.gov.au/content/index.phtml/itemId/779594>